

**401 KAR 50:042. Good engineering practice stack height.**

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET  
Cabinet for Environmental Protection  
Division of Air Pollution

Relates to: KRS 224.320, 224.330, 224.340

Pursuant to: KRS 224.033

Necessity and Function: KRS 224.033 requires the Natural Resources and Environmental Protection Cabinet to prescribe regulations for the prevention, abatement and control of air pollution. This regulation defines good engineering practice stack height which shall be used in establishing emissions limitations.

**Section 1. Applicability.** The provisions of this regulation shall apply to all stacks or all dispersion techniques commenced on or after the classification date defined below, or to those stack heights in existence, or dispersion techniques implemented before the classification date, where pollutants are being emitted from such stacks or using such techniques by stationary sources which were constructed or reconstructed or for which major modifications were carried out on or after the classification date.

**Section 2. Definitions.** As used in this regulation, all terms not defined herein shall have the meaning given them in 401 KAR 50:010, 401 KAR 51:017, or 401 KAR 51:052.

- (1) "Emission limitation" and "emission standard" mean requirements established by the cabinet or the U.S. EPA which limit the quantity, rate, or concentration of emissions of air pollutants on a continuous basis, including any requirements which limit the level of opacity, prescribe equipment, set fuel specifications, or prescribe operation or maintenance procedures for a source to assure continuous emission reduction.
- (2) "Stack" means any point in a source designed to emit air pollutants into the atmosphere, including a pipe or duct but not including flares.
- (3) "A stack in existence" means that the owner or operator had:
  - (a) Begun, or caused to begin, a continuous program of physical on-site construction of a stack; or
  - (b) Entered into binding agreements or contractual obligations, which could not be canceled or modified without substantial loss to the owner or operator, to undertake a program of construction of a stack to be completed in a reasonable time.
- (4) "Dispersion technique" means any technique which attempts to affect the concentration of a pollutant in the ambient air by:
  - (a) Using that portion of a stack which exceeds good engineering practice stack height;
  - (b) Varying the rate of emission of a pollutant according to atmospheric conditions or ambient concentrations of that pollutant; or
  - (c) Increasing final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters, or combining exhaust gases from several existing stacks into one (1) stack; or other selective handling of exhaust gas streams so as to increase the exhaust plume rise, but does not include:
    1. The re-heating of a gas stream, following use of a pollution

control system, for the purpose of returning the gas to the temperature at which it was originally discharged from the facility generating the gas stream;

2. The merging of exhaust gas streams where:
    - a. The source owner or operator demonstrates that the facility was originally designed and constructed with such merged gas streams;
    - b. After July 8, 1985, such merging is part of a change in operation at the facility that includes the installation of pollution controls and is accompanied by a net reduction in the allowable emissions of a pollutant. This exclusion from the definition of "dispersion techniques" shall apply only to the emission limitation for the pollutant affected by such change in operation; or
    - c. Before July 8, 1985, such merging is part of a change in operation at the facility that included the installation of emissions control equipment or was carried out for sound economic or engineering reasons. Where there was an increase in the emission limitation or, in the event that no emission limitation was in existence prior to the merging, an increase in quantity of pollutants actually emitted prior to the merging, the cabinet shall presume that merging was significantly motivated by an intent to gain emissions credit for greater dispersion. Absent a demonstration by the source owner or operator that merging was not significantly motivated by such intent, the cabinet shall deny credit for the effects of such merging in calculating the allowable emissions for the source;
  3. Smoke management in agricultural or silvicultural prescribed burning programs;
  4. Episodic restrictions on residential wood burning and open burning; or
  5. Techniques which increase final exhaust gas plume rise by manipulating source process parameters, exhaust gas parameters, stack parameters, or combining exhaust gases from several existing stacks into one (1) stack; or other selective handling of exhaust gas streams so as to increase the exhaust gas plume rise where the resulting allowable emissions of sulfur dioxide from the facility do not exceed 5,000 tons per year.
- (5) "Good engineering practice (GEP) stack height" means the greater of:
- (a) Sixty-five (65) meters, measured from the ground-level elevation at the base of the stack;
  - (b) 1. For stacks in existence on January 12, 1979, and for which the owner or operator had obtained all applicable preconstruction permits or approvals required under the regulations of the Division of Air Pollution, good engineering practice stack height is two and five-tenths (2.5) multiplied by the height of nearby structure(s) measured from the ground-level elevation at the base of the stack ( $H_g = 2.5H$ ), provided the owner or operator produces evidence that this equation was actually relied on in

establishing an emission limit;

2. For all other stacks, good engineering practice stack height shall be determined by the following equation, provided that the cabinet or the U.S. EPA may require the use of a field study or fluid model to verify GEP stack height for the source:

$$H_g = H + 1.5L$$

where:

$H_g$  = GEP stack height measured from the ground-level elevation at the base of the stack.

$H$  = height of nearby structure(s) measured from the ground-level elevation at the base of the stack.

$L$  = lesser dimension (height or projected width) of nearby structure(s); or

- (c)
  1. The height demonstrated by a fluid model or a field study approved by the cabinet or the U.S. EPA, which ensures that the emissions from a stack do not result in excessive concentrations of any air pollutant as a result of atmospheric downwash, wakes, or eddy effects created by the source itself, nearby structures, or nearby terrain features.
  2. The fluid model study shall be conducted in accordance with guidelines published by the U.S. EPA in "Guidelines for Use of Fluid Modeling to Determine Good Engineering Practice Stack Height," July 1981, U.S. EPA Office of Air Quality Planning and Standards, EPA-450/4-81-003; and "Guideline for Fluid Modeling of atmospheric Diffusion," April 1981, U.S. EPA Environmental Sciences Research Laboratory, EPA-600/8-81-009, filed by reference in 401 KAR 50:015.
- (6) "Nearby" as used in subsection (5) of this section is defined for a specific structure or terrain feature; and means:
  - (a) For purposes of applying the equations provided in subsection (5)(b) of this section, that distance up to five (5) times the lesser of the height or the width dimension of a structure, but not greater than eight-tenths (0.8) km (five-tenths (0.5) mile); and
  - (b) For conducting demonstrations under subsection (5)(c) of this section, not greater than eight-tenths (0.8) km (five-tenths (0.5) mile) except that the portion of a terrain feature may be considered to be nearby if it falls within a distance of up to ten (10) times the maximum height ( $H_t$ ) of the feature, not to exceed two (2) miles if such feature achieves a height ( $H_t$ ) eight-tenths (0.8) km from the stack that is at least forty (40) percent of the GEP stack height determined by the equations provided in subsection (5)(b)2 of this section or twenty-six (26) meters, whichever is greater, as measured from the ground-level elevation at the base of the stack. The height of the structure or terrain feature is measured from the ground-level elevation at the base of the stack.
- (7) "Excessive concentration" is defined for the purpose of determining good engineering practice stack height under subsection (5)(c) of this section and means:

- (a) For sources seeking credit for stack height exceeding that established under subsection (5)(b) of this section, a maximum ground-level concentration due to emissions from a stack due in whole or in part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least forty (40) percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and which contributes to a total concentration due to emissions from all sources that is greater than an ambient air quality standard. For sources subject to 401 KAR 51:017, an excessive concentration alternatively means a maximum ground-level concentration due to emissions from a stack due in whole or in part to downwash, wakes, or eddy effects produced by nearby structures or nearby terrain features which individually is at least forty (40) percent in excess of the maximum concentration experienced in the absence of such downwash, wakes, or eddy effects and greater than a prevention of significant deterioration increment. The allowable emission rate to be used in making demonstrations under subsections (5)(c) of this section shall be prescribed by the new source performance standard that is applicable to the source category unless the owner or operator demonstrates that this emission rate is infeasible. Where such demonstrations are approved by the cabinet, an alternative emission rate shall be established in consultation with the source owner or operator;
- (b) For sources seeking credit after October 11, 1983, for increases in existing stack heights up to the heights established under subsection (5)(b) of this section; either:
1. A maximum ground-level concentration due in whole or in part to downwash, wakes, or eddy effects as provided in paragraph (a) of this subsection, except that the emission rate specified by any applicable State Implementation Plan (or, in the absence of such a limit, the actual emission rate) shall be used; or
  2. The actual presence of a local nuisance caused by the existing stack as determined by the cabinet.
- (c) For sources seeking credit after January 12, 1979, for a stack height determined under subsection (5)(b) of this section where the cabinet requires the use of a field study or fluid model to verify GEP stack height, for sources seeking stack height credit after November 9, 1984, based on the aerodynamic influence of cooling towers, and for sources seeking stack height credit after December 31, 1970, based on the aerodynamic influence of structures not adequately represented by the equations in subsections (5)(b) of this section, a maximum ground-level concentration due in whole or in part to downwash, wakes, or eddy effects that is at least forty (40) percent in excess of the maximum concentration experienced in the absences of such downwash, wakes, or eddy effects.
- (8) "Classification date" means January 1, 1971.

**Section 3. Emissions limitations.** No stack height in excess of GEP height, nor any other dispersion techniques, shall be used to determine the emissions limitations required for control of any air pollutant regulated by the cabinet or the U.S. EPA. This regulation does not in any manner restrict the actual physical stack height of any source.

**Section 4. Public Notice.** Before submitting to the U.S. EPA a new or revised emission limitation that is based on GEP stack height that exceeds the stack height allowed by Section 2(5)(a) or (b) of this regulation, the cabinet shall notify the public of the availability of the demonstration study and shall provide opportunity for public hearing on it.

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